Applicants regards as the invention. A lack of antecedent basis in Claim 46 is also cited. Claims 46 and 55 are herein amended. No new matter has been added.

Claims 26-45 stand rejected under 35 U.S.C. 103(a) as obvious over Flesher et al. (US 4,702,844), Wong Shing et al. (US 6,059,930 or US 6,071,379), or Baron et al. (US 4,894,119) taken in view of Nagarajan et al. (US 6,007,679) or Langley et al. (US 4,913,775) and Cauley et al. (US 5,514,249). The basis of this rejection is respectfully transversed.

Flesher et al. relates to the use of flocculants for dewatering of cellulosic suspension, which flocculants comprise a copolymer having two or more ethylenically unsaturated monomers including a monomer carrying a pendant hydrophobic group. Flesher et al. does not mention dewatering of cellulosic suspensions having high conductivity, and neither a process for the production of paper wherein an anionic microparticulate material and a cationic organic polymer having a non-aromatic hydrophobic group are added to the cellulosic suspension as drainage and retention aids, on the contrary Flesher et al. points out that exceedingly good combination of paper strength and retention and dewatering properties are obtained by the addition of an anionic flocculant polymer preferably an anionic polyacrylamide in conjunction with cationic starch (See Col. 8, lines 2-8 of Flesher et al). Accordingly, Flesher et al. recommends the skilled person to add to a cellulosic suspension an anionic polymer and a cationic starch. Flesher et al. is, by this statement, teaching away from the claimed invention. Therefore, the claimed process is non-obvious over Flesher et al.

U.S. Patent No. 6,059,930 to Wong Shing et al. ('930) relates to a papermaking process wherein a hydrophilic dispersion polymer is added to the cellulosic papermaking slurry. U.S. Patent No. 6,071,379 to Wong Shing et al. ('379) relates to a papermaking process wherein a hydrophilic dispersion copolymers of diallyl-N,N-disubstituted ammonium halide selected from the group consisting of C_1-C_{20} alkyl groups, and (meth)acrylamide, which are utilised for improving retention and drainage. Both the '930 and '379 patents are continuations-in-part of application No. 08/719,283,

Sep. 24, 1996. Wong Shing et al. Neither '930 nor '379 mention a process for the production of paper wherein an anionic microparticulate material and a cationic organic polymer having a non-aromatic hydrophobic group are added to the cellulosic suspension as drainage and retention aids. The hydrophilic dispersion polymer of the '930 and '379 patents can be utilized adjunct with alun or cationic starch, but the '930 and '379 patents emphasis that the dispersion polymer does not require any adjunct for effective retention and drainage activity. By this, both the '930 and '379 patents are teaching away from the invention of the pending application. The paper-making process of the '930 and '379 patents is applicable for use on all types of pulps (see Col. 6, lines 20-25 of the '930 patent), and is best suited for use on furnishes having a pH of from about 3.0 to about 9.0. Neither the '930 nor the '379 patents mention high conductive stocks.

Therefore, a person skilled in the art trying to improve the drainage and retention aid of suspensions having a conductivity of at least 2.0 mS/cm would certainly not chose the addition of a combination of an anionic microparticulate material and a cationic organic polymer having a non-aromatic hydrophobic group to a high conductive suspension, but would rather follow the teachings of Wong Shing et al. and choose to add an anionic hydrophilic dispersion polymer and a cationic starch. Therefore, the invention according to claims 26 to 45 of the present application is non-obvious over the '930 patent and is non-obvious over the '379 patent.

Baron et al. relates to a combination of a cationic polymer and a nonionic polymer employed as a drainage and/or dewatering and/or retention aid. No combination of an anionic microparticulate material and of a cationic organic polymer having a non-aromatic hydrophobic group is mentioned to improve drainage and/or retention by Baron et al. The combination of cationic and nonionic polymers of Baron et al. is said to be applicable to a wide variety of pulp stocks, but high conductive cellulosic suspensions are not mentioned nor the problems in connection therewith.

Addition of the combination of cationic and nonionic polymers in the Example of Baron et al. resulted in better dewatering (CSF 135, 150, and 160 ml) than obtained by a combination of cationic and anionic polymers (CSF 70, 65, 60 and 50 ml), even dewatering without any polymers resulted in a better dewatering (CSF 140 ml) than with addition of the combination of cationic and anionic polymers. Thus, the results of the Example of Baron et al. are teaching away from the claimed invention. Taking account of the teachings of Baron et al. it is very surprising that addition of a combination of an anionic microparticulate material and of a cationic organic polymer having a non-aromatic hydrophobic group gives significantly improved results in respect to drainage and retention on high conductive suspensions. Therefore, a person skilled in the art trying to improve the drainage and retention aid of suspensions would certainly not chose to add a combination of an anionic microparticulate material and of a cationic organic polymer having a non-aromatic hydrophobic group to a high conductive cellulosic suspension, but would rather add a combination of cationic and nonionic polymers. Therefore, the invention according to claims 26 to 45 is non-obvious over Baron et al.

Nagarajan et al. relates to a papermaking process comprising adding to an aqueous cellulosic papermaking slurry a dispersion polymer and microparticles. The papermaking process of Nagarajan et al. is applicable for use on all types of pulps and is best suited for use on chemical pulps. Nagarajan et al. does not teach suggest or disclose a cationic organic polymer having a non-aromatic hydrophobic group and neither conductivity nor any problems involved with high conductive stocks. A person of ordinary skill in the art would have no incentive to look for a process in Nagarajan et al. wherein an anionic microparticulate material and a cationic organic polymer having a non-aromatic hydrophobic group are added to the cellulosic suspension as drainage and retention aids, since Nagarajan et al. is silent about dewatering of suspensions having conductivity of at least 2.0 mS/cm. Therefore, the invention according to claims 26 to 45 is non-obvious over Nagarajan et al.

Langley et al. relates to a process for the production of paper and paperboard by providing an aqueous cellulosic suspension, adding to the suspension a substantially linear synthetic cationic polymer having molecular weight above 500,000 and bentonite. Langley et al. does not suggest using the process for production of paper and paperboard from a cellulosic suspension having a conductivity of at least 2.0 mS/cm. In addition, one of ordinary skill in the art gets no information from Langley et al. about the presently claimed invention and its benefits. None of the Examples of Langley et al. are evaluating the benefits by using cationic polymers having a non-aromatic hydrophobic group in a papermaking process wherein in high conductive stocks are used. Therefore, the invention according to claims 26 to 45 is non-obvious over Langley et al.

Cauley et al. relates to a papermaking process wherein a nonionic or anionic polymeric retention aid is added to a suspension having a high electrolyte content. Cauley et al. also discloses addition of anionic particulate material in conjunction with the polymeric retention aid. The results of the Examples of Cauley et al. show that nonionic or anionic polymeric retention aid added to a high conductive stock performed better than cationic polymeric retention aid, which results are contradicting the results of stocks having a low electrolyte content, in which the cationic polymer performed better (see Examples 4 and 5). Thus, the teachings of Cauley et al. is that a nonionic or anionic polymer has better retention performance than a cationic polymer in high conductive suspensions. Accordingly, Cauley et al. recommends the skilled person to add to a suspension having a high electrolyte content a nonionic or anionic polymer <u>not a cationic polymer</u>. Therefore, the invention according to claims 26 to 45 is non-obvious over Cauley et al.

There is no incentive in Cauley et al. for a person of ordinary skill in the art to look for a process in Nagarajan et al. or in Langley et al. in which process drainage and retention aids comprising an anionic microparticulate material and a cationic organic polymer having a non-aromatic hydrophobic group are added to a suspension that is dewatered on the wire which has a conductivity of at least 2.0 mS/cm, since Cauley et al. teaches addition of nonionic or anionic polymeric retention aid, and by this is

teaching away from the present invention of the pending application. Nagarajan et al. and Langley et al. do not mention suspension that is dewatered on the wire having a conductivity of at least 2.0 mS/cm. Thus, the invention according to claims 26 to 45 is non-obvious over Nagarajan et al. or over Langley et al. in view of Cauley et al. et al.

As mentioned above, Flesher et al. recommends the skilled person to add to a cellulosic suspension an anionic polymer and a cationic starch. Wong Shing et al. '930 and '379 teach the addition of an anionic hydrophilic dispersion polymer and a cationic starch to a cellulosic papermaking slurry. Baron et al. teaches to add a combination of cationic and nonionic polymers to a wide variety of pulp stocks. There is no allowable combination between Flesher et al. or Wong Shing et al. or Baron et al. and Nagarajan et al. or Langley et al. that will arrive at the drainage and retention aid of the invention, which is utilized in a process for producing paper by forming and dewatering an obtained suspension on a wire, wherein the suspension that is dewatered on the wire has a conductivity of at least 2.0 mS/cm, especially since Cauley et al. teaches that addition of nonionic or anionic polymeric retention aid performs better than cationic retention aid. Therefore, the invention according to claims 26 to 45 is non-obvious over Flesher et al. or Wong Shing et al. or Baron et al. taken in view of Nagarajan et al. or Langley et al. and in view of Cauley et al.

Claims 46, 47, 52, 53 and 55 stand rejected under 35 U.S.C. 102(b/e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Flesher et al. (US 4,702,844), Wong Shing et al. (US 6,059,930 or US 6,071,379). The basis of this rejection is respectfully transversed.

Flesher et al. discloses a polymer formed from (a) 1 to 99% by weight of ethylenically unsaturated monomers containing the pendant hydrophobic groups and (b) 10 to 99% by weight of ethylenically unsaturated monomers free of the hydrophobic groups. Flesher et al. does not disclose a cationic vinyl addition polymer comprising in polymerised form (a) at least one non-ionic monomer having a non-aromatic hydrophobic monomer; (b) at least one cationic monomer; and (c) (meth)acrylamide;

wherein the cationic vinyl addition polymer is prepared from a monomer mixture comprising from 75 to 95 mole% of (meth)acrylamide. Thus, the claimed cationic vinyl addition polymer is not anticipated by Flesher et al.

Flesher et al. does not hint at any cationic vinyl addition polymer comprising in polymerised form (a) at least one non-ionic monomer having a non-aromatic hydrophobic monomer; (b) at least one cationic monomer; and (c) (meth)acrylamide, on the contrary Flesher et al. discloses that particularly preferred anionic copolymers are formed of 5 to 50% by weight of acrylic acid and 50 to 90% by weight of the monomer that provides the pendant hydrophobic groups. Therefore, the skilled person would not try to obtain a cationic vinyl addition polymer by polymerising three different monomers because the preferred polymer is anionic and obtained by polymerising two types of monomers, and the skilled person has no incentive from the disclosed cationic polymer to try to obtain the claimed cationic vinyl addition polymer since the disclosed cationic polymer is obtained by polymerising "acrylamide or other non ionic monomer, water soluble, monomer with a cationic monomer carrying the hydrophobe" (see Col. 4, lines 29 –32). Accordingly, the claimed cationic vinyl addition polymer is non-obvious over Flesher et al.

Wong Shing et al. '930 discloses a hydrophilic dispersion polymer obtained from (i) a cationic monomer wherein R_3, R_4 and R_5 are selected from the group consisting of CH_3, C_2H_5 and C_3H_7 and (ii) a second monomer wherein R_2, R_3 and R_4 are selected from the group consisting of H and CH_3. The '930 patent does not disclose a cationic vinyl addition polymer comprising in polymerised form (a) at least one non-ionic monomer having a non-aromatic hydrophobic monomer; (b) at least one cationic monomer; and (c) (meth)acrylamide; wherein the cationic vinyl addition polymer is prepared from a monomer mixture comprising from 75 to 95 mole% of (meth)acrylamide. Thus, the claimed cationic vinyl addition polymer is not anticipated by the '930 patent.

Wong Shing et al. '379 discloses a hydrophilic dispersion polymer obtained from (i) a cationic monomer diallyl-N,N-disubstituted ammonium halide wherein the substituents are selected from the group consisting of C_1-C_{20} alkyl groups, aryl groups, alkyllaryl groups and arylalkyl groups and (ii) a second monomer wherein R_4 and R_5 are selected from the group consisting of C_1-C_{10} straight chain or branched alkylene groups in presence of a dispersant. The '379 patent does not disclose a cationic vinyl addition polymer comprising in polymerised form (a) at least one non-ionic monomer having a non-aromatic hydrophobic monomer; (b) at least one cationic monomer; and (c) (meth)acrylamide; wherein the cationic vinyl addition polymer is prepared from a monomer mixture comprising from 75 to 95 mole% of (meth)acrylamide. Thus, the claimed cationic vinyl addition polymer is not anticipated by the '379 patent.

Neither the '930 patent nor the '379 patent suggest any cationic vinyl addition polymer comprising in polymerised form (a) at least one non-ionic monomer having a non-aromatic hydrophobic monomer; (b) at least one cationic monomer; and (c) (meth)acrylamide. Therefore, the skilled person has no incentive to prepare a cationic polymer other than from a monomer mixture, which comprises two monomers from what is disclosed by Wong Shing et al. '930 or Wong Shing et al. '379 and thus, would not arrive at the cationic vinyl addition polymer of the invention. Accordingly, the claimed cationic vinyl addition polymer is non-obvious over the '930 patent or the '379 patent.

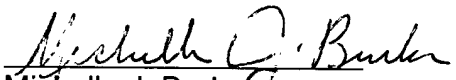
There are no obvious combinations that would possibly have been made without hindsight reliance on Applicant's disclosure since it is only Applicant's disclosure which provides the requisite motivation for such a combination.

Thus, for the reasons set forth above, the present invention is both novel and non-obvious in view of the cited documents. The Applicant respectfully requests that the Examiner reconsider the rejection of the claims and find the application in condition for immediate allowance.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that the Examiner may deem a call desirable:

Michelle J. Burke (914) 674-5459

Respectfully submitted,



Michelle J. Burke
Reg. No. 37,791
Attorney for Applicants

Akzo Nobel Inc.
Intellectual Property Dept.
7 Livingstone Avenue
Dobbs Ferry, NY 10522-3408
(914) 674-5459

Marked Version Showing Changes

46. (TWICE AMENDED) A cationic vinyl addition polymer comprising in polymerized form

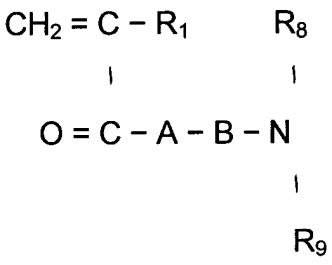
(a) at least one [non-cationic] non-ionic monomer having a non-aromatic hydrophobic monomer;

(b) at least one cationic monomer; and

(c) (meth)acrylamide;

wherein the cationic vinyl addition polymer is prepared from a monomer mixture comprising from 75 to 95 mole% of (meth)acrylamide;

(a) said at least one [non-cationic] non-ionic monomer having a non-aromatic hydrophobic group comprising a monomer represented by the general formula (IV)

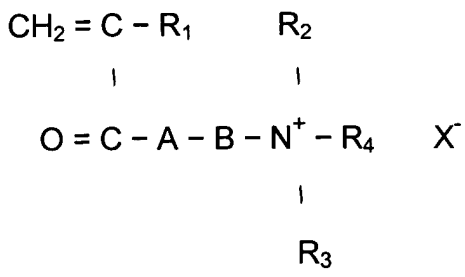


(IV)

wherein R_1 is H or CH_3; A and B represent a single bond between C and N ($O=C-NR_8R_9$); R_8 and R_9 are each H or a substituent containing an alkyl group having from 1 to 6 carbon atoms, at least one of R_8 and R_9 being a substituent containing an alkyl group having from 2 to 6 carbon atoms;

(b) said at least one cationic monomer comprising a cationic monomer selected from the group consisting of:

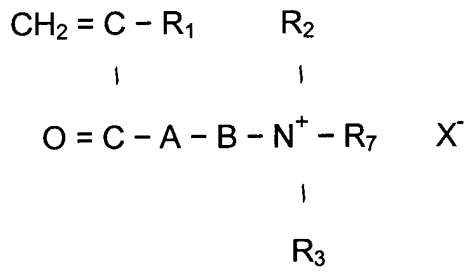
(i) cationic monomers represented by the general formula (I):



(I)

wherein R_1 is H or CH_3; R_2 and R_3 are each H or an alkyl group having from 1 to 3 carbon atoms; A is O or NH; B is an alkylene group of from 2 to 4 carbon atoms or a hydroxy propylene group; R_4 is a non-aromatic hydrocarbon group containing from 4 to 8 carbon atoms; and X^- is an anionic counterion;

(ii) cationic monomers represented by the general formula (III):



(III)

wherein R_1 is H or CH_3; R_2 and R_3 are each H or an alkyl group having from 1 to 3 carbon atoms; A is O or NH; B is an alkylene group of from 2 to 4 carbon atoms, or a hydroxy propylene group; R_7 is H, an alkyl group having from 1 to 3 carbon atoms, a benzyl group or a phenylethyl group; and X^- is an anionic counterion;

(iii) and mixtures thereof.

55. (AMENDED) The cationic vinyl addition polymer of claim 46, wherein the cationic vinyl addition polymer is prepared from a monomer mixture comprising from 5 to 25 mole% of non-ionic monomer having a non-aromatic hydrophobic group, and from 95 to 75 mole% of [other copolymerizable monomers] at least one cationic monomer and (meth)acrylamide.